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Estimating Commercial Expansion in Brookings Resulting from the Anticipated Increases in South Dakota State College Enrollments

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ESTIMATING COMMERCIAL EXPANSION IN BROOKINGS RESULTING FROM THE ANTICIPATED INCREASES IN SOUTH DAKOTA STATE COLLEGE ENROLLMENTS

By

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This thesis is approved as a creditable, independent investigation by a candidate for the degree, Master of Science, and acceptable as meeting the thesis requirements for this degree; but without implying that the conclusions reached by the candidate are necessarily the conclusions of the major department.

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CHAPTER I

INTRODUCTION

The volume of a community's business activity is dependent to a large extent upon the population of its trade area. The relationship between population and business operation is presumedly in the same direction--i.e., one would expect an increase in population to be followed by an increase in business activity. This increase would be reflected not only in the expansion of existing enterprises but also by the introduction of certain more specialized businesses which, by nature, require larger initial populations for success.

The existence of an educational institution in a community provides a number of consumers and would therefore be expected to augment business activity. Also, one would expect an increase in a college's enrollment to result in an increase in business operations.

In this study an attempt is made to estimate the extent of commercial activity in Brookings, South Dakota, which can be expected to result from the estimated increase in enrollment at South Dakota State College by 1970.

The Problem

An educational institution such as South Dakota State College benefits the community in which it is located in various ways. In

addition to the benefits which accrue from the services which the college provides to the community, and from research, educational, cultural and recreational facilities which are open to members of the community, material benefits, such as additional employment, consumer population and business activity are also derived from a college's enrollment and employment.

Businessmen and college personnel recognize that the volume and type of commercial activity in Brookings are both affected by the size of South Dakota State College. While they realize that such influence exists, no attempt has been made to determine its extent or to estimate what effects an increase in the college's size would have on the town's commercial activity.

The Purpose

In order to determine the material benefits which Brookings will derive from the location of South Dakota State College in the community, an estimate of the business expansion which will follow the anticipated increase in enrollment and employment at the college by 1970 is necessary. The objective of this study is to estimate the anticipated commercial expansion.

This report limits commercial expansion induced by the expected increase in the size of the college to the estimated effect which college

growth might have on the dollar volume of existing types of business enterprises in Brookings engaged in service, retail and wholesale trades.

Review of Literature

Increasing interest in the economic aspects of community growth, has resulted in numerous studies in various cities throughout the United States. The general pattern used in making community economic studies has been summarized in the Urban Land Institute's Technical Bulletin No. 29, "Preparing Your City For the Future."[1]

This bulletin points out that in the study of the employment of a community, the concept of an economic base is usually introduced to aid in analyzing the present situation and the future prospects. Internally, there is a fairly definite relationship between population and the number of workers required to keep the inhabitants supplied with goods and services. This economic base concept separates employment into two categories, basic and local--basic relating to those producing goods and services for outside the study area, and local relating to those producing goods and services to be marketed within the area. "Used with discretion and with due regard to its limitations, the economic base concept is a very useful tool in shaping a forecast. It is not a

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[1]Urban Land Institute, "Preparing Your City For the Future," Technical Bulletin No. 29, Washington, D. C. May 1956.

precision instrument, but no forecast can hope to be precise."[2] The economic base concept was not used in this study since the area involved, which is the town of Brookings, cannot be conveniently separated from its surrounding trade area so far as commercial activity is concerned. In other words, there is no clear distinction between basic employment, relating to those providing goods and services for outside the town of Brookings, and local employment, relating to those providing goods and services for within the town itself.

In order to measure the indirect benefits of irrigation in the Payette, Idaho area, M. E. Marts divided the economy into component layers and estimated the amount each layer contributed to National Income.[3] His study was historical in nature. The Payette area was particularly adaptable for a study of this sort in that before irrigation there was virtually no established economy.

As a contrast, John Thompson estimated commercial expansion expected to result from irrigation in the Oahe Dam area.[4] He used

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[2]Ibid., page 13.

[3]Marts, M. E., An Experiment in the Measurement of the Indirect Benefits of Irrigation, Payette, Idaho, A Report for Regional Bureau of Reclamation, United States Department of Interior, Boise, Idaho, 1950.

[4]Thompson, John, Estimating Commercial Expansion from Irrigation Development in the Oahe Unit, Thesis for Master of Science Degree, South Dakota State College, Brookings, South Dakota, November 1953.

anticipated population increase in the area as a basis. From the estimated increase in population he approximated additional income and future business activity.

Studies which attempt to determine economic effects likely to result from an increase in income or population in an area are usually based upon the multiplier concept. In an unpublished report F. K. Harmston, College of Commerce and Industry, University of Wyoming,[5] presented a formula that may be used to show the multiplying effect of additional income on expenditures induced by such an increase. Although, no mathematical formula as such was derived for this study, the multiplying effects of estimated additional college enrollments on employment population and business activity resulting from such an increase were calculated in order to arrive at a final estimate of total population for Brookings in 1970.

Method of Procedure

The amount of per capita income, consumers' tastes and spending patterns, business efficiency, value of the dollar, average size of

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[5]Harmston, F. K., "Use of the Multiplier as a Measure of Indirect Benefits from Natural Resource Development," Proceedings of the Second Annual Conference on Resource-Development Benefits. Rural Sociology Department, South Dakota State College, Brookings, South Dakota, April, 1953.

family, the amount of manufacturing carried on in Brookings and the amount of unemployment are all held constant. It is assumed that the total population of Brookings' trade area varies in proportion to changes in the population of Brookings itself.

In order to estimate dollar volumes in 1970 estimates of future population were made. It was assumed that the relationship between population and business activity would not vary significantly between 1954 and 1970. The 1970 population of Brookings was estimated by applying ratios of employment to total population in 1950 to the initial increase in population comprised of the increase in college enrollment and employment along with additional families associated with these groups, and then working through the multiplying effect. Adjustments were made to take into account effects of increased employment in wholesale trade resulting from increases in dollar volume of retail trade.

The total population estimated for 1970 was multiplied by the 1954 ratios of business volume per person (per capita receipts) to determine the dollar volumes for retail and service trades in 1970. The estimated dollar volume of retail trade in 1970 was multiplied by a ratio of dollar volume of wholesale trade per dollar of retail trade in 1954 to determine the wholesale trade dollar volume in 1970.

CHAPTER II

BASIC DATA AND ASSUMPTIONS

Basic Data

The method used in determining the expansion of commercial activity, which is expected to follow increased enrollments at South Dakota State College, was to apply the ratios of population to business volume in 1954 to the anticipated population in 1970.

A survey of current business volume and employment was attempted. However, a large percentage of the local firms are members of national chain stores and could not disclose their sales volumes. In turn, national offices also refused to release the information. Managers of other local stores were reluctant to quote sales volume figures. In some cases, they refused to do so. Consequently, the survey was dropped. Data relating to sales volume and employment, were taken from the 1954 Census of Business publications. In some cases, estimates for Brookings had to be made from county data. The 1954 population of Brookings was estimated from employment figures.

Estimates of future enrollments for South Dakota State College were based upon South Dakotas' college age youth and the percentage of the nations' youth expected to attend colleges and universities for 1954 through 1970 as reported by the American Association of Collegiate

Registrars and Admission Officers.[6] Enrollment data, relating particularly to South Dakota State College, was obtained from the Office of Admissions and Records and from the Comptroller's office.

Assumptions

The purpose of this study is to estimate what population and business volume in Brookings will be in 1970 based only on the anticipated growth of South Dakota State College.

The amount of per capita income, consumers tastes and spending patterns, business efficiency, value of the dollar, average size of family, the amount of manufacturing carried on in Brookings and the amount of unemployment are all held constant. It is assumed that the total population of the trade area varies proportionally with the population of Brookings itself. Thus ratios based upon the population of Brookings in 1954 and 1970 are considered to be comparable to ratios based upon the total trade area population in 1954 and 1970.

The initial change is assumed to be an increase in South Dakota State College enrollment from 1954 to 1970. Other changes are considered a result of this initial change. This initial change is an increase from 2100 enrollment in 1954 to the estimated 1970 enrollment of 7900.

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[6]American Association of Collegiate Registrars and Admission Officers, College Age Population Trends 1940-1970, 1954 and The Impending Tidal Wave of Students, 1954.

It must be emphasized that these assumptions are not necessarily made with the belief they are precisely true now, or in the long run. They are made only to make possible the isolation of the approximate effects of a change in the enrollment of State College apart from other dynamic factors.

CHAPTER III

ESTIMATING STATE COLLEGE ENROLLMENT AND EMPLOYMENT IN 1970

Enrollment Predictions

Several years ago, the Comptroller's office at South Dakota State College prepared estimates of future enrollments for the years 1955 through 1970. These enrollment estimates were based upon the assumption that 28 per cent[7] of South Dakota's college age population would attend schools within the state in 1955 and that one-quarter of these would go to South Dakota State College. Then since it was nationally forecast that the per cent of college age youth going to college would increase one per cent each year,[8] one-fourth of one per cent was added to the predicted 7 per cent attending South Dakota State College for each year after 1955.

However, when compared to previous enrollments, the estimates for 1955 to 1961 appeared to be too high, so the figures were adjusted

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[7]Prediction for nation was 33% but South Dakota had a net out-migration of college students in 1950 of 17%; 83% of 33% = 28%. American Association of Collegiate Registrars and Admissions Officers, Impending Title Wave of Students, 1954, pp. 20, 28.

[8]Ibid., p. 20.

for the intervening years by interpolation from the actual 1954 figure through the predicted 1961 enrollment.

When the fall enrollments for 1955 and 1956 were compared with the estimates for those years, it was seen that the adjusted figures were quite low. Also, if the enrollments for subsequent years were to increase at the same rate as exhibited in 1955 and 1956, the original estimates would also be low (Table 1). This caused questioning of the reliability of the predicted enrollment figure for 1970.

Table 1. Comparison of Actual South Dakota State College Fall Enrollments for 1954-1957 with Original and Adjusted Predictions for Those Years

Year	College Age Youth in South Dakota	Original Estimate	Adjusted Estimate	Actual Fall Enrollment	
				Number	Per Cent of College Age Youth
1954	48707			2099	4.3
1955	47809	3350	2240	2684	5.6
1956	46541	3370	2370	3215	6.9
1957	45381	3400	2600	3485	7.7

While the primary purpose of this study is not to predict college enrollments, some discussion of present predictions is in order. Of course, any prediction for the future is, at best, an enlightened guess. It is only as reliable as the statistics and possible trends upon which it

is based. In the case of enrollment predictions, it is not reasonable to expect the actual enrollment figures to fall on a straight line projection of a curve of increasing proportional attendance every year. The curve is meant to indicate a general trend. Disturbing influences which may arise one year and drop out another, causing positive or negative deviations from the curve, are, of necessity, ignored when the projection is made. The projected curve is meant to represent a balance or average of all deviations throughout the period for which the projection is made.

Review of Basic Statistics

The latest year for which complete data for making predictions are available is 1950. At that time, 31 per cent of the nation's college age population were expected to attend college. That same year, only 21 per cent of South Dakota's college age youth went to college either in or out of the state. In addition there was a net migration of college students out of the state of 17 per cent.[9] This means that only 17.4 per cent[10] of South Dakota's college age population attended schools

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[9]American Association of Collegiate Registrars and Admissions Officers, Impending Tidal Wave of Students, 1954, pp. 20, 28, 29.

[10]83% x 21% = 17.4%

within the state in 1950. By 1955, this percentage had risen to 19.5 per cent.[11] Assuming that net migration had not changed, approximately 23.5 per cent[12] of South Dakota's youth attended college either in or out of the state in 1955. The Comptroller's office had assumed that 33 per cent, which was the prediction for the nation as a whole, would attend colleges and universities in or out of the state and that 28 per cent would attend schools within the state in 1955.

For the past five years, an average of 28.8 per cent of the students going to college in South Dakota have attended State College. The comptroller's office used 25 per cent as a basis for their estimates. Using a lower percentage for the college did not compensate for the higher percentage used for the whole state, however, and, for this reason, the original estimates for 1955 and 1956 were too high.

Possible Short-Run Deviations from Projection

A review of enrollment statistics for the fall quarters of 1954, 1955 and 1956 indicate four things which may explain the jumps in total

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[11] College age youth in 1955 numbered 47,809. The total enrollment in South Dakota's Colleges according to the Statistical Abstract for 1955 was 9,306. 9,306 ÷ 47,809 = .195.

[12] .195 + .83 = .235.

enrollments for those years. These are increasing numbers and percentages of non-resident, engineering, veteran, and graduate students attending State College (Table 2).

Table 2. Numbers and Percentages of Non-Resident, Engineering, Korean Veteran and Graduate Students Enrolled at South Dakota State College, Fall Quarters, 1954, 1955 and 1956

Type of Student	1954		1955		1956	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
All students	2099	100.0	2684	100.0	3215	100.0
Non-residents	348	16.6	476	17.7	630	19.6
Engineering	491	28.2	816	30.4	906	28.2*
Korean veteran	366	17.4	621	23.1	879	27.3
Graduate	88	4.2	127	4.7	157	4.9

*Approximately 100 engineering students were not accepted in the fall of 1956 due to lack of class room space and facilities. If these additional students had been accepted the number of engineers would have been around 30.3 percent of total enrollment. (i.e., 1006 ÷ 3315 = .303.

For the most part, the increases in these four groups represent short-run deviations rather than indications of new trends in enrollment at South Dakota State College.

Increases in non-resident tuition in 1957 and a further increase planned for 1958 will probably affect the number of out-of-state students enrolling at State College. Less national publicity favoring the engineer-

ing field could decrease the number of students electing engineering majors. Unless a new law is passed giving education allowances to future veterans, the number of veteran students is almost certain to decline after a few more years. Increases in the number of graduate students will be more likely to continue, with growth in the graduate programs offered, than increases in the other groups. It is possible that the increasing numbers and percentages of graduate students are an indication of a 12 year trend.

For the purposes of this study, the increasing percentages of non-resident, engineering and veteran students are assumed to be short-run disturbances causing temporary deviations from the basic tendency or steady movement of enrollment growth at South Dakota State College over the next 12 years. The increases in the graduate division are assumed to continue for at least the next 12 years.

Possible Trends

No straight line projection of a curve of increasing proportional attendance will account for both the 1955 and 1956 enrollments unless it is assumed that the percentage of South Dakota's college age population that attends State College increases by 1.3 per cent per year after 1954. To project such a premise to 1970 would give an enrollment estimate of 17,000 for that year. This represents more than 25 per cent of the

predicted number of college age youth living in South Dakota in that year. There is very little evidence to support such a premise. While "the fact is that colleges and universities have got to grow"[13] it is doubtful that State College could "grow" sufficiently in 12 years to handle 17,000 students, which is more than five times its present enrollment.

Increases resulting from expanding graduate programs may tend to close the gap between the percentage of South Dakota youth who attend college and the percentage for the nation as a whole. If this gap should be closed by 1970, barring short-run disturbances at that time, the predicted enrollment for State College made by the Comptroller's office should be a reasonably good estimate since their predictions were based upon the national percentage predictions. However if 28.8, rather than 25, per cent is used as an estimate for State College's share of South Dakota students, the enrollment estimate for 1970 would be 7900[14] rather than 7300.

For the purposes of this study, it is assumed that South Dakota reaches the predicted national percentage of college age youth going on

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[13]Drucker, Peter F., "Will the Colleges Blow Their Tops," Harpers, July 1956.

[14]Predicted national percentage for 1970 is 49 percent; 83 per cent of 49 per cent would give 40.7 per cent for South Dakota; 28.8 per cent of 40.7 per cent equals 11.7 per cent for South Dakota State College; .117 x 67731 = 7925.

to school in 1970, but that the state's net out-migration of students remains at 17 per cent. It is further assumed that 28.8 per cent of the students attending colleges and universities in South Dakota will attend South Dakota State College. This leads to the conclusion that the enrollment at South Dakota State College in 1970 will be 7900. Enrollment predictions for the years 1954 through 1970 are listed in Table 3. A graphic presentation of these estimates is shown in Figure 1.

Additional College Employees

With an increase in the size of the student body, one would expect an increase in the number of college employees. Some of the groups of employees will not have to be enlarged proportionally to the increased enrollment, however.

The number of administrators depends upon the number of divisions at the college. Since no significant change in organization is anticipated during the next 12 years, no increase in the size of this group is expected.

On the other hand, the size of the teaching faculty and the number of librarians are related to the size of the enrollment at the college. On the one hand, pressure of existing facilities has been increasing the average size class. In some cases the size of classes has already approached feasible limits. On the other hand, there has been some

Table 3. College Age Youth and Estimated South Dakota State College Enrollments, South Dakota, 1954-1970

Year	College Age Youth in South Dakota*	College Enrollment	Increase
1954	48,707	2100	---
1955	47,809	2680	580
1956	46,541	3220	540
1957	45,381	3500	280
1958	44,607	3740	160
1959	44,845	3890	150
1960	45,407	4060	170
1961	46,536	4220	160
1962	47,210	4440	220
1963	47,491	4550	110
1964	49,523	4870	320
1965	53,032	5410	540
1966	56,455	5950	540
1967	60,921	6490	440
1968	64,029	7030	540
1969	65,894	7470	440
1970	67,731	7900	430

* American Association of Collegiate Registrars and Admission Officers, College Age Population Trends 1940-1970, 1954. p. 58.

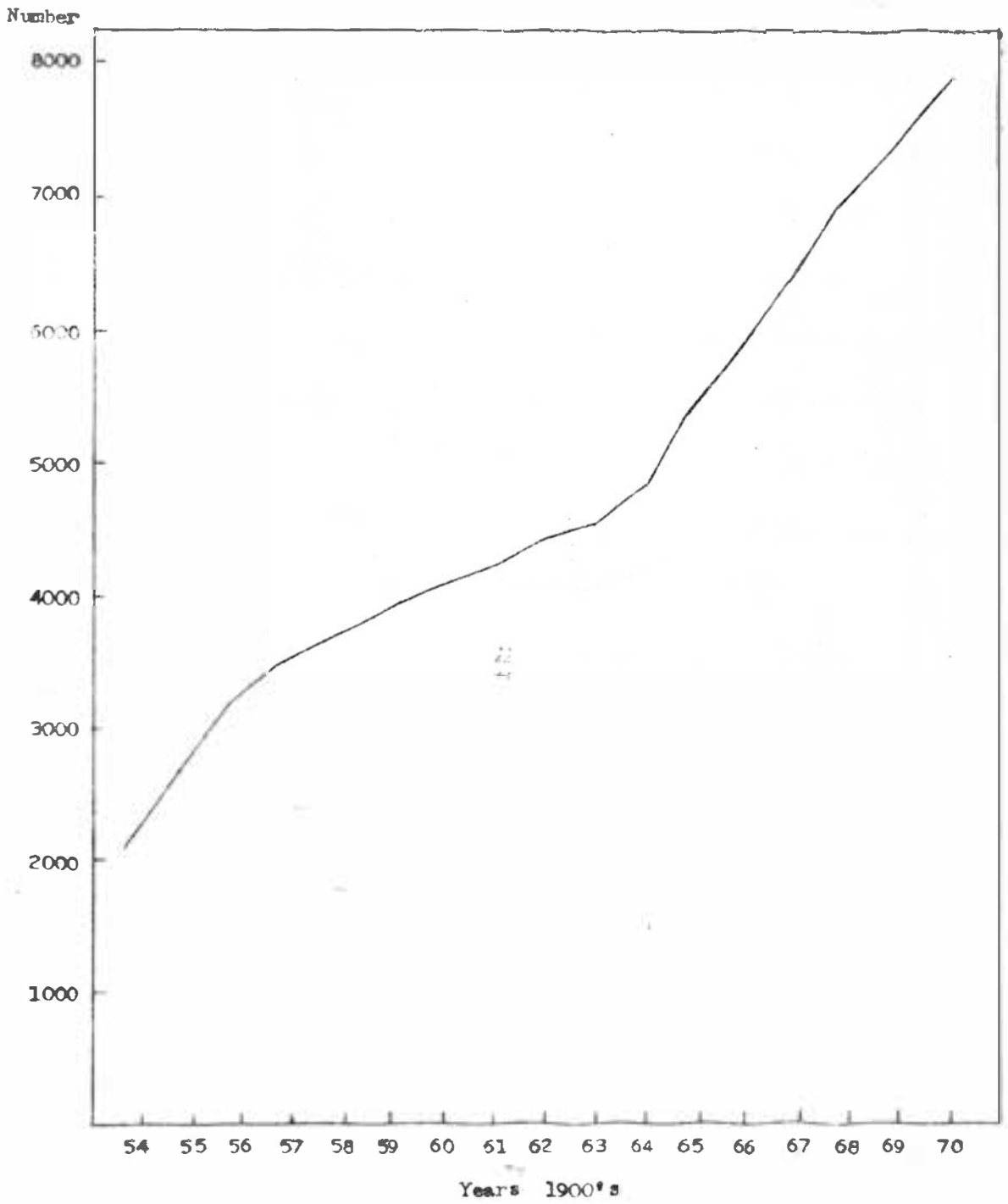

Figure 1. Yearly Estimates of Enrollments for South Dakota State College, Brookings, South Dakota, 1954—1970

tendency for specialized classes previously offered every two years, to be offered every year and for new specialized courses, to be added to the curriculum. In this study the ratios of the number of employees to the number of students in 1970 are taken to be the same as the ratios in 1954.

Appropriations by the State Legislature determine the scope of the service functions performed by the college. There will have been six sessions of the Legislature by 1970. Action in previous years indicates that in 12 years' time the appropriations will be doubled and the staff increased by around 50 per cent.

The size of the custodial and maintenance staff is dependent upon the size of the campus as well as the size of enrollment. Considering these two factors the number in this group can be expected to be increased by about 50 per cent by 1970.

The secretarial and clerical personnel would be expected to increase in number proportionally to the increase in the number of people they serve. Other employees, such as part-time workers and assistants, are assumed to increase in number by about 50 per cent.

A summary of the number of employees in 1954 and the estimated number for 1970 is presented in Table 4.

Table 4. Full Time Employees* at South Dakota State College in 1954-55, With Estimates for 1970

Group	1954-55	1970
Administrators	21	21
Librarians	6	18
Teaching-faculty	183	539
Secretarial and clerical	91	177
Custodial and maintenance	61	91
Special service functions	306	456
Other	61	91
Total	729	1393

* By full time teaching faculty members is meant those who sign a 9-months contract. The 12-months teaching faculty people would be counted at 1 1/3. For all other employees 12 months = full time.

Total Increase in the Size of the College

The number of college employees plus the enrollment in 1954 gives a total of 2829 people directly connected with the college at that time. The estimated number for 1970 is approximately 9300.

CHAPTER IV

ESTIMATING THE INCREASE IN POPULATION IN BROOKINGS

The procedure to be used in estimating the commerical expansion in the retail, wholesale, and service trades in Brookings following the initial increment in State College enrollments from 1954 to 1970 is to estimate the increase in the population of Brookings and then the effect of this increased population on the town's commercial economy.

In this study, the Brookings trade area population is assumed to increase in proportion to increases in the size of Brookings itself. Also, the population is assumed to be homogeneous so far as consumer tastes are concerned so that any addition to population will affect commercial activity in the same manner as any other addition.[15] These assumptions are not made with the belief that such are precisely true. Rather they are taken in order to make it possible to isolate the effects of increased college enrollment upon the economy of Brookings.

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[15]Additional college students have the same effect on commercial activity as, for example, additional manufacturing or industrial employees.

Breakdown of Brookings Population

Population estimates are to be determined through comparisons in employment in 1954 to expected employment in 1970. It is assumed that the ratio between the number of employees in the various groupe to the total population in 1950 remains constant.

Therefore, the population of Brookings is divided into college students; families of married students; college employees and their families; people employed in town and their families; city, county, and federal employees and their families, professional people and their families and others such as farm managers, those engaged in mining, retired persons and the unemployed and their families. In addition, for the purposes of this study, people employed in town are classified according to the type of business with which they are affiliated--e.g., service, retail trade, wholesale trade, or manufacturing.

Estimation of 1954 Population

Since the latest population figures for Brookings are for 1950 while the latest census of business is for 1954, it was necessary to estimate either the population for 1954 or the commercial activity for 1950. Since college and employment data for 1954 were available for most population groups it was decided to estimate the 1954 population. As stated earlier, it was assumed that the relationship between employ-

ment and total population remained constant. Inherent in this assumption is the premise that the percentage of wives working outside the home does not change. The employee per population ratio was 1:2.3. It was this figure which was used to determine the numbers shown in Table 5 as families for the various groups.

Development of Ratios

Ratios for estimating increases in employment and population resulting from the anticipated increase in the enrollment at State College were determined by dividing the number of employees in various population groups by the estimated total population for 1954 of 8830.[16] For example, the ratio for the service trade was 166:8830, or one employee for every 53.2 persons.

Direct ratios of this type, comparing 1954 employment to 1954 population, were used for service and retail trade, construction, finance, insurance, real estate and professional groups. Minor adjustments were made for city, county, and federal employee groups since increases in population will not affect some parts of these groups. For example, only one police chief and one postmaster will be required regardless of the size of Brookings' population. Seventy-five per cent of the 1954 city

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[16]See Table 5.

Table 5. Estimated Population for 1954 According to Various Population Groups, Brookings, South Dakota

Population Group	Number	Families*	Total
College students	2100	286**	2386
College employees	729	948	1677
Town employees			
Service trade	166	216	382
Retail trade	746	970	1716
Wholesale trade	130	169	299
Manufacturing	85	110	195
Construction	175	227	402
Finance, insurance, real estate	80	104	184
City employees	205	266	471
County employees	60	78	138
Federal employees	51	66	117
Professional (other than college)	160	208	368
Others	215	280	495
Total population	4902	3928	8830

* Based upon population per employee ratio in 1950 of 2.3 or 1.3 additional people for each employee.

** 220 married students in 1954 (1.3 x 220 = 286).

Source: Employment figures taken from 1954 Census of Business, United States Department of Commerce, Washington, D. C.

and county employees and 50 per cent of federal employees were assumed to be dependent upon the size of the population. Thus the ratio for city employees was computed by taking 75 per cent of 205, or 154, and dividing by 8830.

Two groups, manufacturing and "others", were assumed to be independent of population size. Actually, some of the manufacturing group, for example cement and cement products production, are indirectly dependent upon population size, or at least on changes in population. Employment and sales data on such manufacturing are not available however. Wholesale trade is dependent in an indirect way on the size of the population, in that a larger population implies a greater volume of retail trade which in turn implies a greater volume of wholesale trade. Therefore, any effects on wholesale trade employment and population will be taken into account after the increase in retail trade volume has been determined.

Application of Ratios

The initial increment in population in Brookings will result from the additional college students, families of married students, college employees and their families. It was estimated that there would be 7900 college students in 1970. This represents an increase of 5800 over the 2100 enrollment of 1954. Following the national estimate that 20 per cent of these students will be married, it is predicted that families of

married students in 1970 will number 2054. This means an increase of 1768. College employees are expected to number 1400 and their families, 1820 in 1970. These show increases of 671 and 872 respectively.[17] Thus the total initial increment in population is 9111.

The ratios of number of employees in the various trade groups to total population in 1954 were then applied to this initial increment. For example, using the ratio for service trade of one employee for every 53.2 people, an addition to population of 9111 people would indicate 172 additional service trade employees. These additional employees would mean more families. Using 1.3 additional persons for every employee, there will be 223 added for the additional 172 employees.

The estimated increase in total population for 1970 effected by the initial increment is shown in Table 6.

Multiplying Effect

This additional increase in population of 3687 will in turn increase the amount of employment in various groups and thus the population as a whole. In other words, the initial increase of 9111 sets off a chain reaction which eventually diminishes to the point where no further increase in population results. For example, an additional 69 service

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[17] See Table 5.

Table 6. Estimated Increase in Population for Brookings in 1970 Based upon an Initial Increment of 9,111

Population Group	Population Ratio (People per employee)	Increase Effected by 9,111 Addition to Population for Employees	Families*	Total
Town employees				
Service trade	53.2	172	223	395
Retail trade	11.8	772	1003	1775
Wholesale trade	----	---	---	---
Manufacturing	----	---	---	---
Construction	50.5	180	235	415
Finance, insurance, real estate	110.4	82	107	189
City employees	57.3	159	207	366
County employees	196.2	46	60	106
Federal employees	339.6	27	35	62
Professional (other than College)	55.2	165	214	379
Others	----	---	---	---
Total	----	1603	2084	3687

* Based upon population per employee ratio in 1950 of 2.3 or 1.3 additional people for each employee.

trade employees will be needed to serve the additional 3687 people.

When all of the population ratios are applied to 3687 and after 1.3 addi-

tional people are added for each new employee, the next increase in population will be 1492. This process was repeated again and again for each new increment until no further increases in population resulted. It was estimated that the 9111 addition led to a further increase of 3687 which led to an increase of 1492. The following increments were 605, 244, 98, 39, 18, and 2. This final increment of 2 did not have any further effect upon employment.

The estimated population for Brookings including college students in 1970, as shown in Table 7, is 24,124. This estimate will be adjusted later for changes in wholesale trade which result from increased retail volume.

Table 7. Estimated Population for Brookings in 1970 According to Various Population Groups

Population Group	Number	Families*	Total
College students	7900	2054	9954
College employees	1400	1820	3220
Town employees			
Service trade	454	590	1044
Retail trade	2040	2652	4692
Wholesale	130	169	299
Manufacturing	85	110	195
Construction	478	621	1099
Finance, insurance, real estate	217	282	499
City employees	472	614	1086
County employees	137	178	315
Federal employees	96	125	221
Professional (other than College)	437	568	1005
Others	215	280	495
Total	14061	10063	24124

* Based upon population per employee ratio in 1950 of 2.3 or 1.3 additional people for each employee.

CHAPTER V

COMMERCIAL EXPANSION

So far, most of the emphasis of this study has been put on estimating the increase in population of Brookings as a result of an anticipated increase in the enrollment of South Dakota State College by 1970. This was done in order to achieve a basis for approximating the additional dollar volume of business in the service, retail and wholesale trade enterprises in Brookings which might be expected by 1970. Several assumptions are necessary, however, before population estimates can be applied in determining commercial expansion. First of all, it is assumed that the ratios of dollar volume in various types of trade to the total population of Brookings in 1970 is the same as corresponding ratios in 1954. It is also assumed that the buying patterns of consumers remain unchanged or, at least, are not significantly altered from 1954 to 1970.

As stated in the preceding chapter, the population of Brookings, including college students, is estimated to be 24,124 in 1970. This estimate does not include any effects from increased employment in the wholesale trade enterprises. In order to estimate the further increase in employment and population it is necessary to estimate the dollar volume of retail trade based upon the estimate of 24,124 population.

It is assumed that the value of the dollar does not change from 1954 to 1970. Thus all estimated dollar volumes for 1970 are in terms of 1954 dollars.

Dollar Volume Increase in Retail Trade

The 1970 dollar volume of sales in the retail trade groups was estimated by applying the per capita sales ratio of 1954 to the estimated population in 1970. The 1954 dollar volumes, per capita sales, and the estimated 1970 dollar volumes are shown in Table 8.

An estimate of increased employment in wholesale trade can now be derived by applying the ratio of dollar volume of retail sales in 1954 in relation to wholesale trade employment in 1954 to the estimated volume of retail sales in 1970. The ratio in 1954 was one wholesale trade employee for every $113,000 of retail trade sales. Thus retail sales of $40,267,000 in 1970 would imply 356 wholesale trade employees and 463 in the family group at that time. This means an increase of 226 employees and 294 others. This total increase of 520 will in turn cause an increase in the employment and population in other areas, a further increase in retail sales and thus a further increase in wholesale trade employment. In other words the increase in wholesale trade employment sets off a chain reaction just as did the increase in college enrollments. The 520 increment causes a further increase in Brookings'

Table 8. Estimated Retail Trade Dollar Volume in 1970 Based Upon Estimated Population of 24,124, Brookings, South Dakota

Retail Business Group	1954 Sales* ($1000)	Per Capita Sales ($1)	1970 Sales ($1000)
Food stores	2,283	258.6	6,238
Eating, drinking places	701	79.4	1,915
General merchandise group	1,757	199.0	4,801
Apparel, accessories stores	433	49.0	1,182
Furniture, home furnishings, appliance dealers	426	48.2	1,163
Automotive group	2,992**	338.8	8,173
Gasoline service stations	797	90.3	2,178
Lumber, building materials hardware, farm equipment	3,556	402.7	9,715
Drug stores, proprietary stores	300**	34.0	820
Other retail stores	1,420	160.8	3,879
Non store retailers	74	8.4	203
Total	14,739		40,267

* 1954 Census of Business, Retail Trade, United States Department of Commerce, Washington, D. C.

** Estimated from county data.

population of 213 which is followed by increases of 86, 38 and 15. The total increase in employment and population resulting from the 520 increment in the wholesale trade area, amounts to 354.

The increase in population of 520 associated with wholesale trade and the 354 in other population groups will cause a further increase in the dollar volume of retail trade sales. This increase is shown in Table 9.

The increase in retail sales of $1,459,000 brings about a further increase in wholesale trade employment of 13 which implies 17 additional people in the families associated with this group. These additional 30 people cause a total increase of 17 in other population groups. This new increase in population of 47 people causes a further increase in retail trade dollar sales of $78,000. An increase of $78,000 of sales would employ only one additional wholesale trade employee and one additional person in the families of that group.

The revised estimates for the total population of Brookings and the total dollar volume of retail sales are shown in Tables 10 and 11.

The total population of Brookings in 1970 is expected to increase to approximately 25,000 because of an initial increment in college enrollments. This represents an increase of 16,170 or 183.1 per cent. This indicates that the 5,800 increase in college students causes an additional 10,370 persons to be added to total population. By dividing

Table 9. Increase in Retail Trade Sales Volume in 1970 as a Result of an Increase of 874 in Population, Brookings, South Dakota

Retail Business Group	Per Capita Sales ($1)	Increase in 1970 Sales ($1000)
Food stores	258.6	226
Eating, drinking places	79.4	69
General merchandise group	199.0	174
Apparel, accessories stores	49.0	43
Furniture, home furnishings, appliance dealers	48.2	42
Automotive group	338.8	296
Gasoline service stations	90.3	79
Lumber, building materials, hardware, farm equipment	402.7	352
Drug stores, proprietary stores	34.0	30
Other retail stores	160.8	141
Non store retailers	8.4	7
Total		1,459

Table 10. Final Population Estimates for 1970 According to Various Population Groups, Brookings, South Dakota

Population Group	Number	Families*	Total
College students	7900	2054	9954
College employees	1400	1820	3220
Town employees			
Service trade	472	613	1085
Retail trade	2117	2751	4868
Wholesale trade	370	481	851
Manufacturing	85	110	195
Construction	496	644	1140
Finance, insurance, real estate	225	293	518
City employees	489	636	1125
County employees	141	183	324
Federal employees	99	129	228
Professional (other than college)	454	590	1044
Others	215	280	495
Total	14,463	10,584	25,047

* Based upon ratio of population to employees in 1950 of 2.3 or 1.3 additional people for each employee.

Table 11. Final Estimate of Dollar Volume of Retail Trade in 1970 Based Upon Total Population of 25,000, Brookings, South Dakota

Retail Business Group	Per Capita Sales ($1)	1970 Sales ($1000)
Food stores	258.6	6476
Eating, drinking places	79.4	1988
General merchandise group	199.0	4984
Apparel, accessories stores	49.0	1227
Furniture, home furnishings, appliance dealers	48.2	1207
Automotive group	338.8	8485
Gasoline service stations	90.3	2261
Lumber, building materials, hardware, farm equipment	402.7	10086
Drug stores, proprietary stores	34.0	852
Other retail stores	160.8	4028
Non store retailers	8.4	210
Total		41,804

10,370 by 5,800 the multiplying effect of additional college students on total population can be determined. This multiplier is approximately 1.8. Thus each additional 10 students is expected to increase the town's population by 18, in the long run. If this multiplier were applied to the yearly increases in college enrollment which were predicted earlier, yearly estimates of Brookings population could be made. These estimates are presented in Table 12. Yearly population estimates are shown graphically in Figure 2.

Total retail trade sales are expected to increase from $14,739,000 in 1954 to $41,804,000 in 1970 as a result of the estimated increase in total population. This represents an increase of $25,528,000 or 183.6 per cent.

Dollar Volume Increase in Wholesale Trade

In order to estimate the dollar increase in wholesale trade, a ratio of 1954 wholesale volume to 1954 retail trade volume was taken. This ratio was then applied to the estimated dollar volume of retail sales in 1970. As shown in Table 13, wholesale trade sales will increase from $6,197,000 in 1954 to $17,579,000 in 1970. This shows an increase of $11,382,000 or 183.7 per cent.

Table 12. Yearly Estimates of South Dakota State College Enrollments and Population for 1954 Through 1970, Brookings, South Dakota

Year	Number of College Students	Town Population Excluding College Students	Total Population
1954	2100	6730	8830
1955	2680	7770	10450
1956	3220	8740	11960
1957	3700	9600	13300
1958	3740	9680	13420
1959	3990	9940	13830
1960	4060	10250	14310
1961	4220	10540	14760
1962	4440	10930	15370
1963	4550	11130	15680
1964	4870	11700	16570
1965	5410	12670	18080
1966	5950	13640	19590
1967	6490	14610	21100
1968	7030	15580	22610
1969	7470	16370	23840
1970	7900	17100	25000

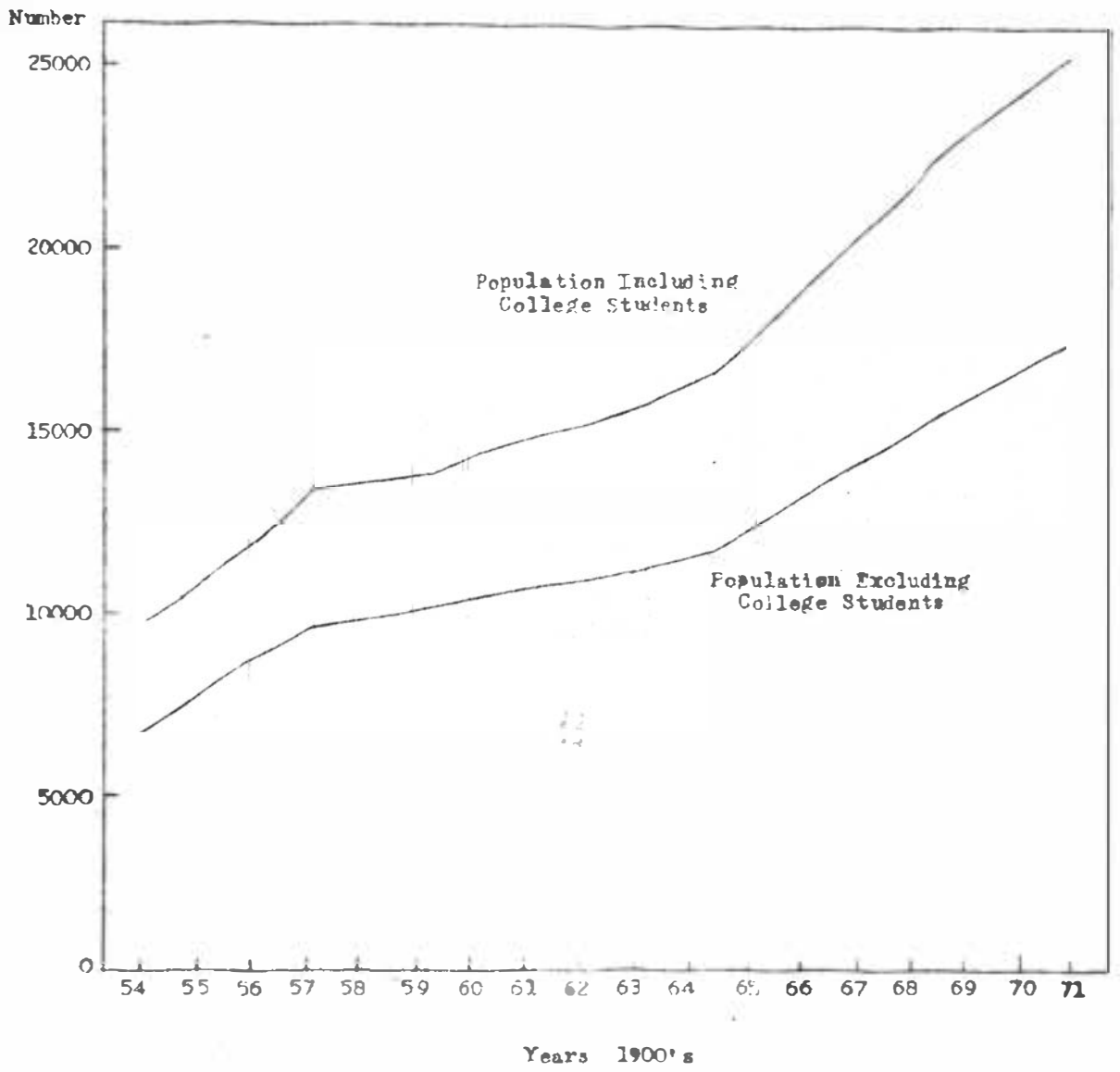

Figure 2. Year Estimates of Population, Excluding and Including College Students, Brookings, South Dakota, 1954–1970

Table 13. Estimated Wholesale Trade Volume Based Upon Estimated Retail Trade in 1970, Brookings, South Dakota

Business	1954 Sales ($1000)	Ratio of Wholesale Trade to Retail Trade	1970 Sales ($1000)
Retail Trade	14,739		41,804
Wholesale Trade	6,197*	1:2378	17,579

* Estimated from county data as given in 1954 Census of Business, United States Department of Commerce, Washington, D. C.

Dollar Increase in Service Trade

Estimates of the dollar volume of service trade by 1970 are, like retail sales, based upon the anticipated population in 1970. Ratios, relating receipts in 1954 to total population in 1954 were applied directly to the expected 1970 population of 25,047. Total service trade receipts increase 183.4 per cent or by $1,627,000. (Table 14)

Table 14. Estimated Service Trade Volume Based Upon Anticipated Population in 1970 of 25,000, Brookings, South Dakota

Type of Service	1954 Receipts* ($1000)	1954 Per Capita Receipts ($1)	1970 Receipts ($1000)
Personal service	244	27.6	691
Automobile repair services, garages	121	13.7	343
All other selected services	522	59.1	1480
Total	887		2514

* 1954 Census of Business, Service Trade, United States Department of Commerce, Washington, D. C.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The objective of this study is to estimate the increase in commercial activity in Brookings by 1970 resulting from the anticipated increase in enrollment at South Dakota State College. This report limits commercial expansion to increases in dollar volume in the existing types of business enterprises in Brookings engaged in service, retail and wholesale trades.

In order to estimate dollar volumes in 1970, estimates of future population of Brookings were made. It was assumed that the relationship between population and business activity would not vary significantly between 1954 and 1970. The total population estimated for 1970 was multiplied by the 1954 ratios of business volume per person (per capita receipts) to determine the dollar volumes for retail and service trades in 1970. The estimated dollar volume of retail trade in 1970 was multiplied by a ratio of dollar volume of wholesale trade per dollar of retail trade in 1954 to determine the wholesale trade dollar volume in 1970.

The college enrollment in 1970 is estimated to be 7900. This represents an increase of 5800 or 276.2 per cent over the 1954 enrollment. The population of Brookings, including college students, in 1970

is estimated to increase to about 25,000 as a result of increased college enrollments. This means an increase of 16,170 or 183.1 per cent in total population or an increase of 10,370 or 154.1 per cent in town population excluding college students.

If the increase in town population excluding college students is divided by the increase in the number of college students, a multiplier can be determined. This multiplier is approximately 1.8. Thus each additional 10 students is expected to result in an ultimate increase of 18 in Brookings' population.

The dollar volume of retail trade in 1970 is estimated to be $41,804,000. This represents an increase of $27,065,000 or 183.6 per cent. Dollar volume of service trade is estimated to increase from $887,000 in 1954 to $2,514,000 in 1970--a 183.4 percentage increase. Wholesale trade dollar volume will increase from $6,197,000 in 1954 to $17,579,000 in 1970. This represents an increase of 183.7 per cent. The total increase in dollar volume for all three types of trade estimated to follow an increase in South Dakota State College enrollments by 1970 amounts to $40,074,000 or 183.6 per cent.

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